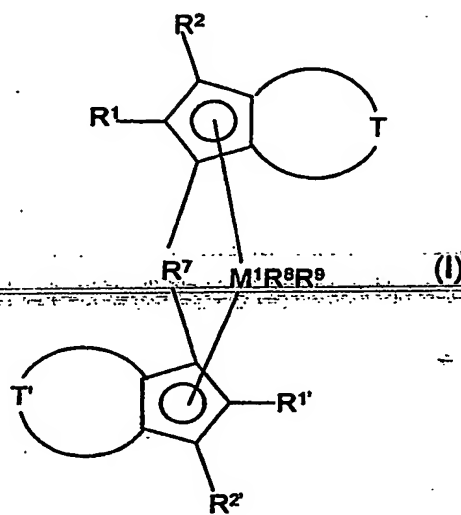
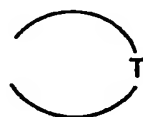


We claim:

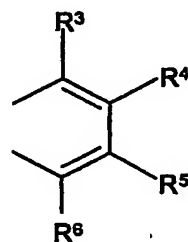
1. A transition metal compound of the formula (I)



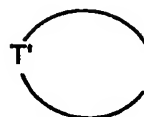
where



is



and

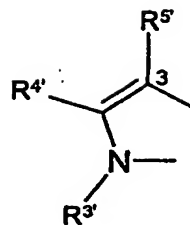
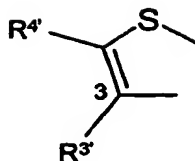
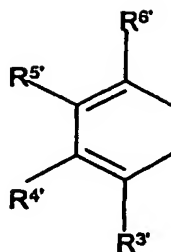


is a divalent group such as

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and

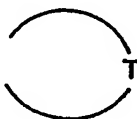
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- M¹** is titanium, zirconium or hafnium;
R¹, R² are identical or different and are each a C₁-C₂₀ group;
R¹, R² are identical or different, identical to or different from R¹ or R² and are each hydrogen or a C₁-C₂₀ group;
R³ is a C₆-C₁₈-aryl group or C₄-C₁₈-heteroaryl; or a fluorinated C₆-C₂₀-aryl or C₇-C₂₀-alkylaryl, where the aryl part of these groups may bear one or more linear or branched C₁-C₁₈-alkyl, C₁-C₁₈-alkoxy, C₂-C₁₀-alkenyl or C₃-C₁₅-alkylalkenyl groups as substituents, or R³ together with R⁴ forms a monocyclic or polycyclic ring system which may in turn be substituted;
R³ is hydrogen or a C₁-C₄₀ group or R³ together with R⁴ forms a monocyclic or polycyclic ring system which may in turn be substituted;
R⁴, R⁴ are identical or different and are each hydrogen or a C₁-C₂₀ group;
R⁵, R⁵, R⁶, R⁶ are identical or different and are each hydrogen or a C₁-C₂₀ group;
R⁷ is a bridging structural element between the two indenyl radicals and is selected from the M²R¹⁰R¹¹ group, where M² is silicon, germanium, tin or carbon and R¹⁰ and R¹¹ may be identical or different and are each hydrogen or a C₁-C₂₀-hydrocarbon-containing group;
R⁸, R⁹ may be identical or different and are each halogen, linear or branched C₁-C₂₀-alkyl, substituted or unsubstituted phenoxide, or R⁸ and R⁹ are joined to one another and form a monocyclic or polycyclic ring system which may in turn be substituted.

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2. A transition metal compound as claimed in claim 1, wherein

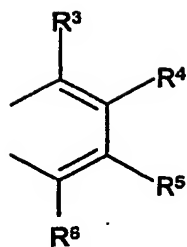
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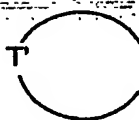
is

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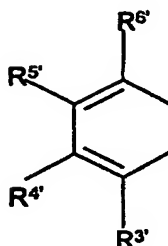
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is

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where the substituents R^3 to R^6 and $R^{3'}$ to $R^{6'}$ are defined as for formula (I).

3. A transition metal compound as claimed in claim 1 or 2, wherein

M^1 is zirconium;

R^1, R^2 are identical or different and are each a C_1 - C_{12} -alkyl group;

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$R^{1'}, R^{2'}$ are identical or different and are each hydrogen, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, tert-butyl, cyclopentyl or cyclohexyl;

$R^3, R^{3'}$ are identical or different and are each a C_6 - C_{18} -aryl group or two radicals R^3 together with R^4 and/or $R^{3'}$ together with R^4 may form a monocyclic or polycyclic ring system which may in turn be substituted, and $R^{3'}$ may also be hydrogen;

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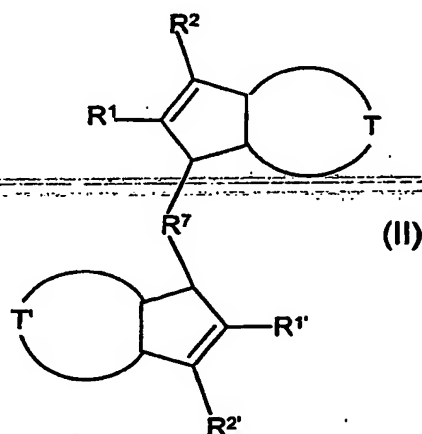
$R^4, R^{4'}$ are identical or different and are either hydrogen or R^4 together with R^3 and/or $R^{4'}$ together with $R^{3'}$ form a monocyclic or polycyclic ring system;

$R^5, R^{5'}, R^6, R^{6'}$ are identical or different and are each hydrogen, linear or branched C_1 - C_{18} -alkyl, C_2 - C_{10} -alkenyl or C_3 - C_{15} -alkylalkenyl; C_6 - C_{20} -aryl, C_4 - C_{18} -heteroaryl, C_7 - C_{20} -arylalkyl; or fluorinated C_1 - C_{12} -alkyl, C_2 - C_{10} -alkenyl, C_6 - C_{20} -aryl or C_7 - C_{20} -arylalkyl;

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R^7 is a bridging structural element $SiR^{10}R^{11}$ and R^{10} and R^{11} are identical or different and are each a C_1 - C_{20} -hydrocarbon-containing group and R^8, R^9 are each chlorine or methyl.

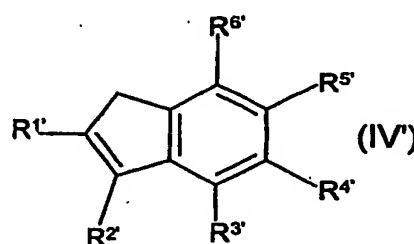
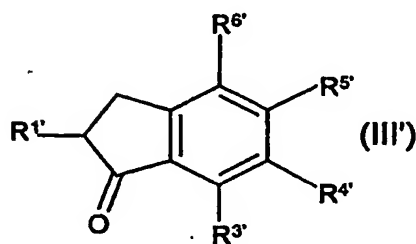
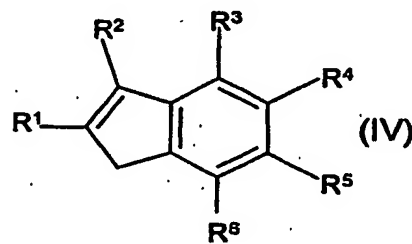
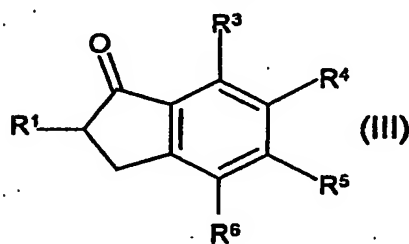
4. A ligand system of the formula (II) or its double bond isomers,



where the variables are as defined for formula (I).

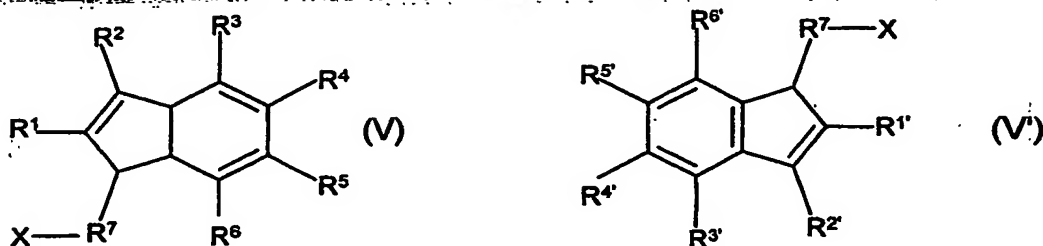
5. A process for preparing ansa-metallocenes of the formula (I), which comprises the following steps:

- a) reaction of a 1-indanone of the formula (III) or (III') with an organometallic compound $M^3R^2_mHal_n$ or $M^3R^{2'}_mHal_n$ and subsequent elimination to form the substituted indene of the formula (IV) or (IV'),



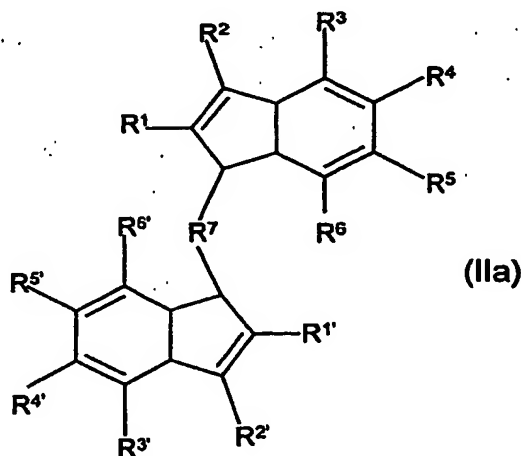
where the variables $R^1, R^1', R^2, R^2', R^3, R^3', R^4, R^4', R^5, R^5', R^6$ and R^6' are as defined for formula (I), M^3 is an alkali metal, an alkaline earth metal, aluminum or titanium, Hal is halogen, m is an integer and is equal to or greater than 1 and the sum of $m+n$ corresponds to the valence of M^3 ;

- b) deprotonation of the substituted indene of the formula (IV) or (IV') and subsequent reaction of the deprotonated indene with compounds of the type R^7X_2 to form compounds of the formula (V) or (V') or their double bond isomers,



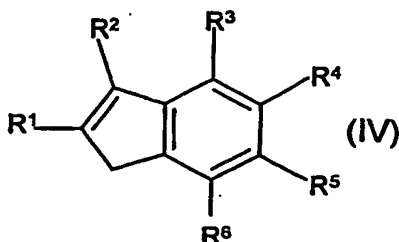
where X is Cl, Br, I or O-tosyl and R^7 is as defined for formula (I);

- c) reaction of the compound of the formula (V) or (V') with a further deprotonated indene which has been obtained by deprotonation of (IV) or (IV') to form the ligand system of the formula (IIa) or its double bond isomers,



- d) deprotonation of the ligand system of the formula (IIa) or its double bond isomers and reaction with compounds of the type $X_2M^1R^8R^9$ to give the ansa-metallocene of the formula (I), where X is as defined for formula (V) and M^1, R^8 and R^9 are as defined for formula (I).

6. An indene of the formula (IV) or its double bond isomer,



10 where

R^1, R^2 are identical or different and are each a C_1 - C_{20} group;

R^3 is a C_6 - C_{18} -aryl group or C_4 - C_{18} -heteroaryl; or a fluorinated C_6 - C_{20} -aryl or C_7 - C_{20} -alkylaryl, where the aryl part of these groups may bear one or more linear or branched C_1 - C_{18} -alkyl, C_1 - C_{18} -alkoxy, C_2 - C_{10} -alkenyl or C_3 - C_{15} -alkylalkenyl groups as substituents;

R^4 is hydrogen or a C_1 - C_{20} group;

R^5, R^6 are identical or different and are each hydrogen or a C_1 - C_{20} group.

7. A catalyst system comprising one or more compounds of the formula (I) as claimed in any of claims 1 to 3 and one or more cocatalysts and/or supports.
8. The use of a catalyst system as claimed in claim 7 for the preparation of a polyolefin, in particular a copolymer of various olefins.
9. The use of a compound of the formula (I) as claimed in any of claims 1 to 3 for the preparation of a polyolefin, in particular a copolymer of various olefins.
10. The use as claimed in claim 8 or 9 for the preparation of ethylene-propylene copolymers.
11. A process for preparing a polyolefin by polymerization of one or more olefins in the presence of one or more compounds of the formula (I) as claimed in any of claims 1 to 3.

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